

What is claimed is:

- 1 1. An expandable device for thermally affecting tissue, comprising:
2 a fluid conduit having a longitudinal axis; and
3 an expandable element, the expandable element including:
4 a wall defining an inner volume, the wall having a tissue contact
5 region, the tissue contact region being non-coaxial with the longitudinal axis of the
6 fluid conduit, the tissue contact region being operable to have a first contact
7 surface area and a second contact surface area, the second contact surface area
8 being larger than the first contact surface area.
- 1 2. The device according to claim 1, wherein the fluid conduit is a
2 flexible catheter.
- 1 3. The device according to claim 1, wherein the expandable member is
2 a balloon.
- 1 4. The device according to claim 1, wherein the expandable element has
2 a non-circular shape.

1 5. The device according to claim 1, wherein the wall is arranged to
2 define a substantially circular shape.

1 6. The device according to claim 1, wherein the wall is arranged to
2 define a spider-like shape.

1 7. The device according to claim 1, wherein the fluid conduit is
2 comprised of:
3 an inlet conduit, the inlet conduit providing a path for thermally
4 transmissive fluid from the fluid source to the expandable member; and
5 an outlet conduit, the outlet conduit providing a path for the thermally
6 transmissive fluid from the expandable member to the fluid source,
7 wherein the fluid source, the fluid supply conduit and the expandable
8 element define a circulation circuit.

1 8. The device according to claim 1, further comprising a fluid
2 distribution member provided within the interior volume of the expandable
3 member.

1 9. The device according to claim 8, wherein the fluid distribution
2 member is a vane.

1 10. The device according to claim 8, wherein the fluid distribution
2 member is an injection member, the injection member having an opening defining
3 a fluid communication path between the fluid conduit and the interior volume.

1 11. The device according to claim 10, wherein a plurality of injection
2 members each have a length different from at least one other injection member.

1 12. The device according to claim 10, wherein a plurality of injection
2 members each have a length equal to each other injection member.

1 13. The device according to claim 1, wherein the tissue contact region is
2 aligned substantially parallel to the longitudinal axis of the fluid conduit.

1 14. The device according to claim 10, wherein the injection member is
2 comprised of a plurality of arms.

1 15. The device according to claim 10, further comprising a junction
2 provided at an end portion of the fluid conduit, the junction forming a fluid tight
3 seal between the injection member and the fluid conduit.

1 16. The device according to claim 15, wherein the junction is a resilient
2 material.

1 17. The device according to claim 1, further comprising an accessory
2 conduit, the accessory conduit being in communication with the inner volume of
3 the expandable element.

1 18. The device according to claim 1, further comprising a temperature
2 sensor configured to detect temperature of a tissue to be treated.

1 19. The device of claim 1, wherein the expandable member is comprised
2 of a resilient material.

1 20. The device of claim 1, wherein the wall is comprised of a top and a
2 bottom opposite the top, a height of the expandable element being measured from
3 the top of the expandable element to the bottom of the expandable element,
4 wherein the expandable element has a deployed diameter to height ratio of
5 approximately 1-to-1 to approximately 2-to-1, the deployed diameter being
6 measured at a widest part of the wall when the device is in a deployed state.

1 21. An expandable element for thermally affecting tissue, comprising:
2 a port, the port having a longitudinal axis; and
3 a wall defining an inner volume, the wall having a tissue contact region, the
4 tissue contact region being non-coaxial with the longitudinal axis of the port, the
5 tissue contact region being operable to have a first contact surface area and a
6 second contact surface area, the second contact surface area being larger than the
7 first contact surface area;
8 the port being formed through the wall.

1 22. The device according to claim 21, wherein the expandable member is
2 a balloon.

1 23. The device according to claim 21, wherein the expandable element
2 has a non-circular shape.

1 24. The device according to claim 21, wherein the wall is configured to
2 define a substantially circular shape.

1 25. The device according to claim 21, wherein the wall is configured to
2 define a spider-like shape.

1 26. The device according to claim 21, further comprising a fluid
2 distribution member provided within the interior volume of the expandable
3 member.

1 27. The device according to claim 26, wherein the fluid distribution
2 member is a vane.

1 28. The device according to claim 26, wherein the fluid distribution
2 member is an injection member, the injection member having an opening defining
3 a fluid communication path between the fluid conduit and the inner volume.

1 29. The device according to claim 28, wherein a plurality of injection
2 members each have a length different from at least one other injection member.

1 30. The device according to claim 28, wherein a plurality of injection
2 members each have a length equal to each other injection member.

1 31. The device according to claim 21, wherein the tissue contact region
2 is aligned substantially parallel to the longitudinal axis of the port.

1 32. A method of using an expandable element to affect a thermal energy
2 change in tissue of a patient's body, comprising:
3 creating an opening in the patient's body;
4 inserting at least a portion of the expandable element into the opening and
5 into a region between an outer barrier of the patient's body and the tissue, the
6 expandable element being in fluid communication with a fluid conduit, the
7 expandable element having a tissue contact region, the tissue contact region being
8 non-coaxial with a longitudinal axis of the fluid conduit, the tissue contact region
9 being operable to have a first contact surface area and a second contact surface
10 area, the second contact surface area being larger than the first contact surface
11 area;
12 operating the tissue contact region to the second contact surface area; and
13 infusing a thermally transmissive fluid into the expandable element.